

Patent claims

1. A plastics product with high strength and flexibility,

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characterized in that

10 it comprises from 10 to 50% by weight of at least one crosslinked thermoplastic and from 90 to 50% by weight of at least one crosslinked melamine resin ether.

2. The plastics product as claimed in claim 1, characterized in that at least one thermoplastic

15 is

an ethylene-vinyl acetate copolymer,

a partially hydrolyzed ethylene-vinyl acetate copolymer whose vinyl acetate content is from 5 to 50% by weight,

20 an ethylene-acrylate copolymer,

an ethylene-methacrylate copolymer whose ethylene content is from 60 to 95 mol%,

a hydroxy-end-group-terminated aliphatic poly-ester,

25 a polycaprolactone,

a poly(meth)acrylate whose content of hydroxy-C₁-C₆-alkyl (meth)acrylate in the molecule is from 2 to 10 mol%,

30 from 5 to 20% by weight of a vinyl acetate or C₁-C₈-alkyl acrylate,

a C₁-C₈-alkyl-methacrylate-grafted polyethylene,

an ethylene-C₃-C₈ olefin copolymer whose ethylene content is from 80 to 95 mol%,

a styrene-butadiene-styrene block copolymer,

35 a styrene-ethylene-butadiene-styrene block copolymer and/or a thermoplastic polyurethane.

3. The plastics product as claimed in claim 1 or 2, wherein at least one melamine resin ether has a weight-average molecular weight of from 1500 to 200 000 and a molar melamine/formaldehyde ratio of
5 from 1:1.5 to 1:4.
4. The plastics product as claimed in at least one of the preceding claims, characterized in that the thermoplastics comprise, based on the total weight
10 of the thermoplastics, from 0.1 to 2% by weight of thermally decomposing free-radical generator.
5. The plastics product as claimed in at least one of the preceding claims, characterized in that the
15 melamine resin ethers comprise, based on their total weight, from 0.1 to 2% by weight of hardener.
6. The plastics product as claimed in at least one of the preceding claims, characterized in that it comprises, based in each case on the plastics products, from 10 to 70% by weight of fillers, adsorber materials, inorganic fibers, and/or synthetic fibers, from 1 to 15% by weight of hydrophobicizers, from 1 to 10% by weight of flame retardants, from 0.1 to 2% by weight of pigments, from 0.1 to 2% by weight of stabilizers, and/or from 0.1 to 5% by weight of auxiliaries.
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- 30 7. The plastics product as claimed in claim 6, characterized in that the fillers and adsorber materials are Al_2O_3 , $\text{Al}(\text{OH})_3$, SiO_2 , barium sulfate, calcium carbonate, glass beads, siliceous earth, mica, powdered quartz, powdered slate, hollow microbeads, carbon black, talc, phyllosilicates, molecular sieves, rock flower, chalk, talc, cellulose, and/or cyclodextrines, preferred fillers being phyllosilicates of the type
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represented by montmorillonite, bentonite, kaolinite, muscovite, hectorite, fluorohectorite, kanemite, revdite, grumantite, ilerite, saponite, beidelite, nontronite, stevensite, laponite, taneolite, vermiculite, halloysite, volkonskoite, magadite, rectorite, kenyaite, sauconite, borofluorophlogopite, and/or synthetic smectites,

and preferred adsorber materials being phyllosilicates of the type represented by montmorillonite, bentonite, hectorite, molecular sieves of types A, X, Y, and in particular 5A, silicon-dioxide-based adsorbers, and/or hollow microbeads.

8. The plastics product as claimed in claim 6 or 7, characterized in that at least one hydrophobicizer is an organosilicon compound of the type represented by organosilanols, organosiloxanes, organosilanes, organoaminosilanes, amino-end-group- or hydroxy-end-group-terminated polyorganosiloxanes; surface-fluorinated SiO₂ nanoparticles, polytetrafluoroethylene nanoparticles, and/or imide-group-containing copolymers of ethylenically unsaturated C₄-C₂₀ dicarboxylic anhydrides.
9. The plastics product as claimed in at least one of the preceding claims, characterized in that the plastics product is an injection molding or is a tube, sheet, or profiles.
10. A process for the production of a plastics product, as claimed in claim 1,
characterized in that
the plastics product is produced via shaping and crosslinking of pseudoplastic melts of mixtures of melamine resin ethers and of thermoplastics.
11. The process as claimed in claim 10, characterized in that the plastics product is produced by an extruder process in which, in a first stage of the process, in a first extruder segment, melt mixtures composed of melamine resin ethers and of thermoplastics are prepared,

below and then melt mixture is devolatilized after homogenization,
and then, in the second extruder segment, hardener
and also decomposing free-radical generator are
5 fed and homogenized in the melt mixture, and
in a second stage of the process, the melt mixture
is either discharged from the extruder, and
pelletized,
the molding composition pellets being melted in a
10 third stage of the process and the pseudoplastic
melt being processed in presses, extruders or
injection-molding machines, with crosslinking, to
give semifinished products or molded materials, or
is heated in a third extruder segment, the pseudo-
15 plastic melt being discharged, with crosslinking,
through a die, and being drawn off in the form of
a semifinished product.

12. The process as claimed in claim 11, characterized
20 in that the extruder process has at least one
extruder whose length is from 30 to 60 D, equipped
with side feed equipment for solid and liquid
substances and vacuum devolatilization.

25 13. The process as claimed in claim 11 or 12, characterized
in that the melt mixtures composed of mel-
amine resin ethers and of thermoplastics are pre-
pared at melt temperatures of from 100 to 170°C.

30 14. The process as claimed in at least one of
claims 11 to 13, characterized in that the mixture
components are fed collectively into the feed
hopper, or at least one melamine resin ether is
35 fed into the thermoplastic melt after melting of
the thermoplastic by way of side-feed equipment
or
at least one thermoplastic is fed into the
thermoplastic melt after melting of the melamine

resin ether by way of side-feed equipment.

15. The process as claimed in at least one of claims 11 to 14, characterized in that, in the second extruder segment, melt temperatures of from 100 to 150°C have been set into the melt mixture.
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16. The process as claimed in at least one of claims 11 to 15, characterized in that, in the second extruder segment, hardener and/or thermally decomposing free-radical generator are used in the form of masterbatch comprising from 60 to 90% by weight of thermoplastics.
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17. The process as claimed in at least one of claims 11 to 16, characterized in that fillers, adsorber materials, inorganic fibers, synthetic fibers, flame retardants, pigments, stabilizers, and/or auxiliaries are fed into the extruder in the first and/or second extruder segment.
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18. The process as claimed in at least one of claims 11 to 17, characterized in that, in the third extruder segment, a temperature of from 150 to 240°C has been set.
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19. The process as claimed in claim 10, characterized in that the plastics product is produced by a sintering process.
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20. The process as claimed in claim 19, characterized in that, in a first stage of the process, mixtures composed of at least one melamine resin ether and of at least one thermoplastic are sintered in high-speed mixers, the sintered mixture is cooled, and, after cooling, hardener and/or thermally decomposing free-radical generator are applied in a drum mixer to the sinter mixture, and,
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in a second stage of the process, the sinter mixture is melted, and the pseudoplastic melt is processed in presses, extruders, or injection-molding machines, with crosslinking, to give 5 semifinished products or molded materials.

21. The process as claimed in claim 19 or 20, characterized in that fillers, adsorber materials, inorganic fibers, and/or synthetic fibers are sintered 10 concomitantly in the first stage of the process.
22. The process as claimed in at least one of claims 19 to 21, characterized in that the residence time in the high-speed mixer is from 3 to 30 15 min and the final temperature is from 90 to 160°C.
23. The process as claimed in at least one of claims 19 to 22, characterized in that the temperatures to which cooling of the sinter 20 mixture takes place are from 50 to 120°C.
24. The process as claimed in at least one of claims 19 to 23, characterized in that, in the second stage of the process, the sinter mixture is melted at temperatures of from 150 to 240°C. 25
25. The process as claimed in at least one of claims 19 to 24, characterized in that, in the first stage of the process, flame retardants, 30 pigments, stabilizers, and/or auxiliaries are applied in a drum mixer.
26. The process as claimed in at least one of claims 10 to 25, characterized in that, at least 35 one melamine resin ether is an etherified melamine resin condensate which is free from hydroxymethyleneamino groups bonded to the triazine rings of the melamine resin condensate and from

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-NH-CH₂-O-CH₂-NH- groups linking triazine rings, and in which C₁-C₁₈ alcohols and/or diols with molecular weights of from 62 to 20 000 have been used for the etherification of the hydroxymethyl-amino groups.

27. The process as claimed in at least one of claims 10 to 26, characterized in that, as hardener for at least one melamine resin ether, acidifiers of the type represented by blocked sulfonic acids, aliphatic C₄-C₁₈ carboxylic acids; aromatic C₇-C₁₈ carboxylic acids; alkali metal salts or ammonium salts of phosphoric acid; C₁-C₁₂-alkyl ethers or C₂-C₈-hydroxyalkyl esters of C₇-C₁₄-aromatic carboxylic acids, or of inorganic acids; salts of melamine or of guanamines with C₁-C₁₈-aliphatic carboxylic acids; anhydrides, half esters or half amides of C₄-C₂₀ dicarboxylic acids; half esters or half amides of copolymers composed of ethylenically unsaturated C₄-C₂₀ dicarboxylic anhydrides and of ethylenically unsaturated monomers of the type represented by C₂-C₂₀ olefins and/or C₈-C₂₀ vinyl aromatics; and/or salts of C₁-C₁₂ alkylamines and, respectively, alkanolamines with C₁-C₁₈-aliphatic, C₇-C₁₄-aromatic, or alkylaromatic carboxylic acids, and also with inorganic acids of the type represented by hydrochloric acid, sulfuric acid, or phosphoric acid, are used.

28. The process as claimed in at least one of claims 10 to 27, characterized in that, as thermally decomposing free-radical generator for the crosslinking of the thermoplastic component, free-radical generators whose thermal decomposition has been concluded below 210°C are used, of the type represented by acyl peroxides, alkyl peroxides, hydroperoxides, peroxy carbonates, and/or peresters.

29. The use of the plastics product as claimed in any of claims 1 to 9 in the vehicle industry, mechanical engineering, electrical engineering, and electronics.